

July

Supplement to the "FURTHER DISCUSSIONS ON THE EFFECTS OF PHASE DIFFERENCE
ON THE H-ANTIGEN TRANSDUCTION IN SALMONELLA DIPHASIC STRAINS"

--- THE EFFECT OF PHASE-VARIATIONS IN THE TRANSFORMED CLONES ON THE YIELD
OF H-TRANSDUCED TYPES.

Tetsuo Iino

(July 28, 1955)

As has been reported already, the frequency of each type produced by the
transduction of H_1 -or H_2 -factor is as follows,

$$\overset{*}{H}_1 h_2 \text{ ----- } t_1 r_1 \quad (1')$$

$$H_1 \overset{*}{H}_2 \text{ ----- } t_2 d_2 \quad (2')$$

$$\overset{*}{H}_1 H_2 \text{ ----- } t_1 r_2 \quad (3')$$

$$H_1 h_2^* \text{ ----- } t_2 d_1 \quad (4')$$

The ~~alternatives~~ types and their frequencies produced by the phase variation of
these types are

$$\overset{*}{H}_1 H_2 \text{ ----- } a t_1 r_1 \quad (1'')$$

$$H_1 \overset{*}{H}_2 \text{ ----- } b t_2 d_2 \quad (2'')$$

$$\overset{*}{H}_1 h_2 \text{ ----- } b t_1 r_2 \quad (3'')$$

$$H_1 \overset{*}{H}_2 \text{ ----- } a t_2 d_1 \quad (4'')$$

a = Rate of $\overset{*}{H}_1$ -transformed clones, which contain phase-2 cells produced by
the phase variation during the course of the screening, to the total
transformed phase-1 clones.

b = Rate of transformed phase-2 clones, which contain phase-1 cells produced
by the phase variation during the course of screening, to the total
transformed phase-2 clones.

When antiserum for the H-antigens of the recipient cells are used as selective
agents, type (1'') and (2'') are not detectable as well as type (3'') and (4'').

Thus, the expected ratio of phase-1 transduced type to phase-2 transduced type is

$$\overset{*}{H}_1 : \overset{*}{H}_2 = t_1(r_1 + b r_2) : t_2(d_2 + a d_1) \quad (6).$$

The transduced types when donor, recipient or both contain only single phase are shown in Table 6. Table 6 indicates that, if phase-variation occur during the screening of the transduced types,

(1). H_2 -transduced type will appear on the " $1 \rightarrow 1$ ",

(2). H_1 -transduced type will appear on the " $2 \rightarrow 2$ ",

and (3). both transduced type will appear on the " $1 \rightarrow 2$ ",

in addition to the types which appear when phase variations don't occur in the transformed clones; but

(4). the ratio of \bar{H}_1^* to \bar{H}_2^* will not change by the phase-variation of transformed clone during the screening of transduced types, and express directly the ratio of the transduction efficiencies of H_1 and H_2 .

In other words, when phase-2 is used as donor and phase-1 as recipient, we can eliminate the influence of the phase-variations, which occur during the screening, on the yield of transduced type, and can discuss the transduction efficiencies directly from the number of each transduced type.

Table 6.

The results of H-transduction between diphasic strains, expected from the proposed hypothesis when selected by the antiserum for the antigen of the recipients. ---(2) The expected results when phase-variations occur during the screening of the transduced types.

Phase of donor	Phase of recipient	Ratio of H ₁ -transduced type to H ₂ -transduced type			
		(when phase variations occur in the transformed clones)		(when phase variations don't occur in the transformed clones)	
		H ₁	H ₂	H ₁	H ₂
1 & 2	1 & 2	$t_1(r_1+br_2)$	$t_2(d_2+ad_1)$	t_1r_1	t_2d_2
1	1 & 2	$t_1(r_1+br_2)$	at_2	t_1r_1	0
2	1 & 2	$t_1(r_1+br_2)$	t_2	t_1r_1	t_2
1 & 2	1	t_1	$t_2(d_2+ad_1)$	t_1	t_2d_2
1 & 2	2	bt_1	$t_2(d_2+ad_1)$	0	t_2d_2
1	1	t_1	at_2	t_1	0
1	2	bt_1	at_2	0	0
2	1	t_1	t_2	t_1	t_2
2	2	bt_1	t_2	0	t_2